UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/541,965	10/25/2005	Masahiro Fujii	71866	8926

23872 7590 04/07/2008

MCGLEW & TUTTLE, PC
P.O. BOX 9227
SCARBOROUGH STATION
SCARBOROUGH, NY 10510-9227

EXAMINER	
ELVE, MARIA ALEXANDRA	
ART UNIT	**PAPER NUMBER**
3742	

MAIL DATE	DELIVERY MODE
04/07/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/541,965	FUJII, MASAHIRO	
	Examiner	Art Unit	
	M. Alexandra Elve	1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *04 January 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,9,15 and 17-22* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,9,15 and 17-22* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *11 July 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1, 9, 15 & 17-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Choo et al. (USPN 6,407,360) in view of Okamoto (USPN 5,502,001) and Xuan (USPN 6,303,898).

Choo et al. discloses a laser cutting (scribing) apparatus and method for glass panels. YAG or CO_2 lasers are used. In addition, Choo et al. discloses:

> …a laser cutter includes a laser unit for irradiating a laser beam with a specific wavelength along a cutting line marked on an object being cut; and a cooling unit for cooling the cutting line which said laser beam has been irradiated. (col. 3, lines 60-65)

> The light modulator comprises a beam splitter for splitting an incident laser beam of a laser unit into two laser beams by transmitting a part of the incident laser beam and reflecting the remainder of the incident laser beam, a light modulation part for modulating the laser beam reflected from the beam splitter into a visible ray thereby to generate an indicative laser beam, and a reflective mirror for reflecting the modulated indicative laser beam at a selected angle.

> The cutting laser beam transmitted and the indicative laser beam reflected are both irradiated on the marked cutting line such that the indicative laser beam is positioned behind the cutting laser beam with respect to the traveling path of the two beams.

According to further another aspect, a laser cutter includes a first laser unit for irradiating a first laser beam with a first wavelength along a cutting line marked on an object being cut, a cooling unit for cooling the marked cutting line irradiated by the first laser beam to generate cracks at the cooled cutting line, a second laser unit for irradiating a second laser beam with a second wavelength onto the crack of the object being cut, a light detecting part for detecting the second laser beam reflected by the crack; and a control unit for outputting a signal for correcting a path of the first laser beam by comparing a real cutting path obtained by the light detecting part with the marked cutting line to determine whether the real cutting path deviates from said marked cutting line.

Here, the first and second laser units respectively includes a laser oscillating unit for oscillating a laser beam, a refraction lens disposed in front of the laser oscillating unit to refract the laser beam at a selected direction, a focusing lens group for focusing the refracted laser beam on the marked cutting line and a focusing lens housing containing the focusing lens group.

In addition, the light detecting part is a light detecting sensor for detecting light amount of the second laser unit reflected by the crack. (col. 4, lines 20-57)

Referring to FIG. 29, the laser cutter 204 including the light modulation unit 270 is established in a dark chamber to prevent a laser beam with high power from affecting an observer. In order to observe a moving path of the laser beam for the cutting, **window 410** is established on a selected position of the wall of the chamber 400.

The light modulation unit 270 established below a focusing lens housing 226 for irradiating the laser beam, includes a housing 272, a **beam splitter 252** for splitting the incident laser beam into two laser beams by passing through a part of the incident laser beam and reflecting the remainder of the incident laser beam, a light modulation part 254 for modulating the laser beam divided by the reflection from the beam splitter 252, and a reflective mirror 256 for reflecting the modulated laser beam at a selected degree. (col. 18, lines 49-63)

…the laser cutter 206 is established within a dark chamber, and a window is disposed on the wall of the chamber such that the moving path of the cutting laser beam 228 is visible to an observer.

Like the first laser unit 220, the second laser unit 290 includes a laser oscillating unit 292, a refraction lens 294, a focusing lens group(not shown), and a focusing lens housing 296. At a selected portion of the wall of the focusing lens housing 296 is established a light sensor 298. The light sensor 298 senses a beam reflected from crack which is generated along the scribe line 120. Preferably, the light sensor 298 is a sensor detecting light amount reflected from the crack generated along the scribe line of the substrate 100.

As shown in FIG. 31, the sensor 298 and the first and second laser 220 and 290 are connected to a controller 400 such as a microprocessor. The microprocessor 400 compares pre-stored path of the marked scribe line 120 with a path of a real cutting line 120' from light amount sensed by the light sensor 298 and thereby controls to stop the operation of the laser cutter 206 or to correct traveling path of the moving plate 280. (col. 21, lines 44-64)

Meanwhile, the substrate 100 rapidly heated by the irradiation of the cutting laser beam 228 of the first laser 220 is rapidly cooled down by coolant sprayed from the spraying nozzle 244. By cooling the heated scribe line 120, crack is generated along the scribe line 120 of the substrate 100(ST500).

Meanwhile, the crack detecting laser beam 237 focused at a few μm by the focusing lens group of the second laser 290 and then irradiated from the focusing lens group housing 296 is irradiated onto the crack generated, following the coolant sprayed along the scribe line 120.

When the crack detecting laser beam 237 is irradiated onto the crack, a part of the crack detecting laser beam 237 is reflected by the crack. At this time, the sensor disposed on the wall of the focusing lens housing 296 of the second laser 290 detects an amount of the light reflected from the crack, transforms the detected light amount signal into a corresponding electric signal, and transfers the transformed electric signal to the microprocessor 400.

Next, the microprocessor 400 perceives a propagation path 120' of the crack generated from the input electric signal and compares the propagation path 120' of the crack with the pre-stored path of the marked scribe line 120. By comparison of two paths, it is determined whether the propagation path 120' of the generated crack deviates from the marked scribe line 120(ST510).

When the propagation path 120' of the crack corresponds with the path of the marked scribe line, the cutting step is continued. (col. 22, lines 38-67)

The microprocessor 400 determines again whether the propagation path 120' corresponds with the path of the marked scribe line 120(ST 540). From the determination, if two paths correspond each other, the cutting step continues to be performed(ST 550). If two paths do not correspond, it returns to the step(ST 520) for measuring the deviating angle θ.

Thus, according to the fifth embodiment, since the propagation path of the crack corresponds automatically with the path of the marked scribe line 120, a cutting failure deviating from the marked scribe line 120 is substantially prevented. In addition, since the cutting failure is limited to one attached panel and the same cutting failure in the following panels can be avoided by correcting the cutting path, mass failures can be prevented. Moreover, the lower cutting failure rate extends, the operation time of the apparatus, resulting in an improvement of through-put. (col.23, lines 17-33)

In addition, see figures 29, 30 & 31.

The beam splitter 252 disposed below the focusing lens housing 226 includes two prisms attached together each of which has an oblique face. A polarizing film is attached to each of the two oblique faces. The beam splitter 252 passes through a part of the incident laser beam 274 and reflects the remainder.

Choo et al. teaches the use of one laser beam which is split into an incident and a reflected beam prior to the scribing, but not splitting after the scribing as in instant claims. In addition, the use of fiber optics is not taught.

Okamoto disclose a laser beam system for cutting silicon links. The laser moves through a lens (17) to a half mirror (12) to another lens (18), to a beamsplitter (15) and on to one more lens (5) and the sample (2) (see figure 20). The surface profile of the sample (2) or internal defects of the sample (2) are detected by the light projected onto the sample and reflected therefrom. The reflected beams are measured by a CCD or current detector. The other laser beams cut the silicon link. The apparatus is such that smaller samples and enhanced resolution are possible.

It would have been obvious to one of ordinary skill in the art at the time of the invention to use split the two laser beams after sampling, as taught by Okamoto in the Choo et al. apparatus and process because of the enhanced accuracy.

Xuan discloses a laser texturing device of silicon wafers. The laser texturing employs a fiber-optic laser delivery system. The laser moves through a beam splitter and a polarizer. Fiber optic cables are optically linked at one end to a laser light beam source, and at the other lens to a microfocusing lens. The use of fiber optic cable delivery system facilitates alignment and reduces maintenance.

It would have been obvious to one of ordinary skill in the art at the time of the invention to use a fiber optics as taught by Xuan in the Choo et al. apparatus because of the ease of alignment.

Response to Arguments

Applicant's arguments with respect to claims have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. See US PTO-892.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to M. Alexandra Elve whose telephone number is 571-272-1173. The examiner can normally be reached on 7:30-4:00 Monday to Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King can be reached on 571-272-1742. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

March 29, 2008.

/M. Alexandra Elve/
Primary Examiner, Art Unit 1793